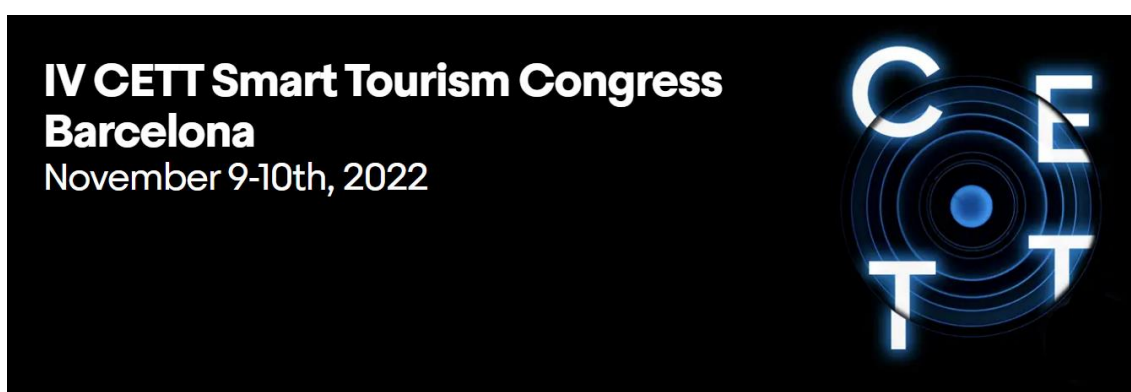


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KEYNOTE PAPERS

Benefits and challenges of new ICT data for the estimation and modelling of mobility by tourists

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ABSTRACT

The world is changing, and not only in aspects of mobility. Technologies, data and the number of apps is increasing. Social and mobility habits and economic models are changing. Sustainability and equity are new concerns. In the mobility sector it is vital to see how the world is changing and to detect challenges and opportunities to achieve the proposed objectives.

OD matrices that describe mobility patterns provide major input to most transport analysis models. Since OD matrices are not yet directly observable, they are usually estimated indirectly. Data from new sources such as mobile phone records and GPS traces from mobile apps are emerging alternatives that allow for cheaper and timely estimates. However, they are still hindered by weaknesses that must be studied for use as input to transportation models. This paper presents a discussion about mobility data obtained from mobile phone records, with the goal of establishing a methodology for validating the obtained OD matrices and generating the appropriate input for traffic assignment models. Spatial and temporal consistency of OD data elaborated from mobile records has been proved to be useful for transportation modelling needs. As a second goal, a discussion about GPS traces obtained from technological companies is included.

Estimation of mobility by tourists in terms of origins and destinations was omitted in the past, data were scarce. New sources offer cheap and flexible ways to include tourism mobility in the urban mobility and planning ecosystem.

New mobility modes, the door-to-door concept and digitalisation of mobility are some of the new challenges in the roadmap towards sustainable mobility focused on technology and people. These new concepts intrinsically involve quantification and measurement. Without data, it will be impossible to monitor and respond to the new demands and needs of users including tourists.

1. INTRODUCTION

Origin to Destination (OD) matrices are one of the main inputs to most transport analysis procedures and to all transport analysis models, whether they are based on static assignment, dynamic assignment, or traffic simulation. OD matrices describe mobility patterns in a selected geographical area, usually after it has been partitioned into a set

of Traffic Analysis Zones that are conventionally identified as origins and destinations of trips across the area.

Travel demand analysis is the first step in the traditional 4 steps of Transport Models, and it is usually based on a well-established methodology that consists of detailed travel household surveys that are accurately designed, supported by careful sampling procedures, and whose results are combined with socioeconomic census data. Unfortunately, these procedures have some drawbacks: they are very expensive, so they cannot be repeated as frequently as necessary; data processing is complex and usually takes a significant amount of time, which leads to the availability of results being delayed; and, finally, they provide a static picture of the mobility patterns only at the time of the survey. As a result of these drawbacks, time dependencies, segmented mobility patterns and variabilities cannot be taken into account. The author has been involved in the estimation of modal dynamic OD matrices obtained from CDRs (Call Detail Records) compiled from Orange customers (Montero et al. 2019).

The advent of Information and Communication Technologies is changing the OD estimation scenario. In particular, access to mobile phone data sets offers an unprecedented possibility to investigate mobility patterns for particular segments; i.e., tourists.

The type of accessible anonymized data can vary widely: from aggregated records representing the number of unique devices using a given antenna for each specific time interval (e.g., one hour or over the whole day); to the so-called Call Detail Records (CDR) using various formats (e.g., anonymized user ID, longitude, latitude or time stamp). Researchers have recently addressed the problem of how to extract OD mobility patterns from this data by means of data processing approaches that extract stays and pass-byes from raw data. In addition, they have derived procedures for identifying location types, which typically indicate home, work or other. By processing this first level data in combination with data from other sources (usually census data, but tourist-based survey data is also a possibility), the OD matrix for a given segment of the population can ultimately be extended from the sample of data records to the whole population. Since this is a hot research topic, there is a rich literature that reports on recent findings. Files delivered by NOMMON in a case study contained 444 millions of OD registers, each including 13 fields. A high performance PC including a 50 Gb RAM memory was used to transform NOMMON's OD data to formats needed by statistical analysis using RStudio.

A second source of data are GPS traces. INRIX (<http://inrix.com/>) is one of the technological companies that gathers real-time, predictive and historical data from different sources of particular low-latency GPS tracking data. In this way, it facilitates the automatic extraction of valuable mobility information through distinct data mining processes. For decades, transportation researchers have largely used data from active data requests, such as travel surveys in which subjects self-report their activities and travel via paper, web, or phone interviews; travel surveys coupled with GPS loggers, in

which subjects both complete questionnaires and carry GPS loggers; and pure GPS-based surveys, in which subjects only carry GPS loggers (Chen et al. 2016; Montini, Antoniou, and Axhausen 2017; Shen and Stopher 2014).

In this work, the focus is on passive data, meaning data not collected through active data requests; rather, it is generated for purposes that are not intended for research but can potentially be used for it. One goal is to discuss GPS tracking data that is passively collected from private and fleet vehicles using INRIX traffic information, which at the same time produces GPS data that is delivered to the company's analytics processes. In particular, INRIX GPS tracking data for the first crown of the Barcelona metropolitan area refer roughly to 50% of passive data from consumer vehicles.

2. EXPERIMENTAL STUDY AREA

The selected site for the computational experiments is the first crown of the Barcelona metropolitan area. It is composed of 18 municipalities with 2,837,000 inhabitants, the highest population concentration (around 60%) in the metropolitan area. Its primary road and public transportation network contain more than 200 bus lines with over 4,000 stops, 10 metro lines, 15 railways lines, and 2 tramway networks.

The UPC has been developing and calibrating a transportation planning model in VISUM as a part of the Virtual Mobility Lab (VML), a strategic project aiming to address and evaluate new scenarios involving MaaS (Mobility as a Service) services that are funded by CARNET (<http://www.carnetbarcelona.com/>).

3. DODME PROBLEM

The estimation of the network traffic state, its likely short-term evolution, the prediction of the expected travel times in a network, and the role that mobility patterns play in transport modeling, namely, in traffic management and information systems, especially in urban areas and in real-time applications, stimulate the research interest in dynamic traffic models.

The main components of the core engine of these systems use a dynamic origin-to-destination (OD) matrix that describes the time dependencies of travel patterns in urban scenarios as the main input. This is a relevant reason for drawing the continuous attention of researchers to the dynamic origin-destination matrix estimation (DODME) problem, as a quick look at recent publications shows.

Additionally, the complexity of the problem, its underdetermination, and the many alternatives that it offers make it an appealing research topic. Furthermore, the availability of new traffic measurements due to the pervasive penetration of ICT measurements offers new paths to explore. The objective of a PhD thesis study (Ros-Roca, 2021) was to provide an insight into what can be achieved when, in addition to link

flow counts, travel times that come from treated GPS traces are directly or indirectly considered in the formulation of a DODME.

A rough classification of the approaches that are taken in these studies could be as follows (Ros-Roca et al, 2021):

- Analytical approaches that are supported by hypotheses on the relationships between the observed link flows on subsets of links of a road network that is equipped with sensors, and the assignment matrices that are used in the estimation of the corresponding link flows. Assignment matrices that are provided by a traffic assignment method, usually a dynamic traffic assignment (DTA), in those approaches aim at estimating discretized time-dependent origin-to-destination (OD) matrices.
- Similar hypotheses exist that instead resort either to a derivative-free optimization or methods that numerically approximate the calculation of the derivatives because the assignment matrix is usually generated by a DTA whose network loading is based on traffic simulation, i.e., a mesoscopic approach, and therefore the result is not analytical and, consequently, the resulting relationships cannot be differentiated. Although a variety of derivative-free methods were used in the past, in recent years, despite some inconveniences, most researchers tend to use the stochastic perturbation stochastic approximation (SPSA) or variants of it within a computational framework of simulation-based optimization.
- Data-driven problem reformulations that are based on approaches that calculate the key components of the modeling approach from the empirical measurements from ICT applications.

However, leaving aside some attempts to include other data sources in the formulation of the OD estimation, i.e., Bluetooth travel times between pairs of suitably located antennas, most of the references rely on the observed link flow counts and a historical origin-to-destination (OD) matrix as the information to solve the problem. There are alternative approaches in the literature that are based on license plate recognition data collection applications. These approaches were not considered in the thesis since it was focused on GPS tracking. Newly published papers considered sensitivity analysis of malfunctioning sensors on the static OD flow estimation.

GPS tracking of equipped vehicle trajectories, or other similar ICT measurements from mobile devices, which are becoming accessible, do not require any investment in specific equipment and ensure a pervasive penetration through the traffic network, enabling the estimation of travel times between selected (likely arbitrary) pairs of points along well-identified paths (sub-paths) in the network, or speed profiles for road segments. Therefore, the inclusion of path travel times from GPS trajectories that are reconstructed from waypoints in dynamic origin–destination matrix estimation (DODME)

is an interesting research problem, particularly from the perspective of investigating which is the most appropriate algorithmic approach.

The aim of the thesis consisted of a comparison of simulation-optimization methods and a new analytical approach that was based on GPS data. The experimental framework allowed for optionally adding GPS tracking information to traffic count measures and a distance term to a reliable origin-to-destination (OD) historical matrix. We explored how to use a modified stopping criterion that was based on the variation of structural similarity, limiting the number of iterations with respect to classical stopping criteria to improve the quality of the results.

4. METHODOLOGY TO EXPLORE GPS TRACKING DATA

GPS devices can record the travel time and the coordinates of locations with low latency, which can therefore report speed, start time, end time, and the routes of trips. However, GPS devices cannot automatically identify trip ends or report travel modes and trip purposes. INRIX sources of GPS data are fleets of commercial vehicles and private cars. Therefore, travel mode is known by default, but trip purposes for private consumers are not available and identification of trip end is somewhat arbitrary, since it uses some common established rules (10 min of inactivity or motion within a 100 m radius). Trip concept does not apply to fleets, and delivery circuits are useful only for monitoring traffic conditions. But they are not suitable for either addressing the origin-destination (OD) spatial distribution of trips or validating OD path route choice models.

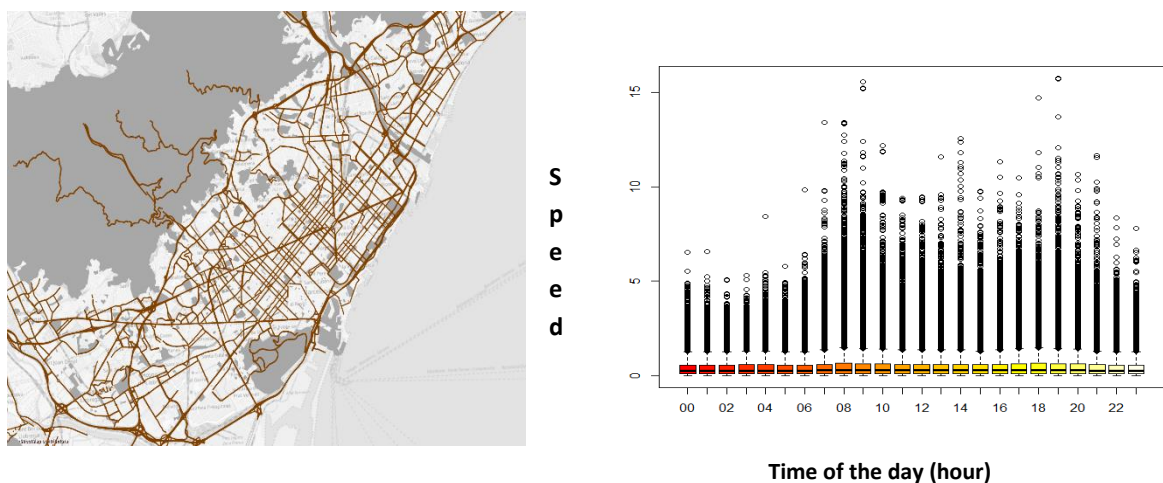


Fig. 1. (a) First crown of Barcelona metropolitan area; (b) INRIX XD Segment hourly speeds (km/h) for internal trips

One month (March 2017) of INRIX GPS tracking datasets were used. The raw data consists of 846,295 trips (internal for origin/destination in the study area) and 61,925,267 waypoints in .csv files of, respectively, 236 MB (247,534,055 bytes) and 1.78 GB (1,912,468,534 bytes). Additionally, speed profiles for INRIX XD Segments (7,964 for the study area, see Fig. 1. (a)) are available at a temporal resolution of 1 min and travel times

can be derived. The average length of an XD Segment is about 200m, with 1 km being the longest, and it usually follows main arteries or major streets in the traffic network.

The target population addressed in this study are representative drivers of internal trips to the Barcelona metropolitan area. Raw data from flat .csv files had to be filtered, transformed and aggregated/grouped before the actual data analysis could take place. Once the data have been restructured using the most basic methods of data science and analytics, there are several other more complex tasks such as splitting, applying and joining data, computing table margins, and casting/merging data.

Despite the sheer vastness of current research and practice on big data, its role in transportation remains underexplored, particularly in terms of needs and available opportunities. Real data sets tend to be imperfect, contain errors, outliers, missing data, and extra noise. Tools are required for either detecting or correcting them, as the application of certain analytics techniques may require specific conditions for the data set (only binary variables, centred data, normality, only qualitative variables, etc.). In this case, they would be tools for verifying that those conditions hold, or eventually transforming data appropriately to meet those conditions.

Data preparation tasks are often time consuming and difficult, and few papers in the literature address this critical topic; mainly because the approaches taken should be tailored to each specific application and human interaction is required. The author is conscious of the importance of very careful and rigorous pre-processing, for which we have dedicated sufficient time to these efforts.

Pre-processing methodological steps were applied to INRIX data and meta-data provided by INRIX was used to define proper variable types (quantitative, qualitative, time variables). The distribution of provider type depends on the geospatial type. Focusing on internal trips to Barcelona's Metropolitan area, almost 53.9% of the total trips on weekdays pertain to passenger cars (Audi and other expensive cars). Almost 70% of the trips pertain to EndpointType 0, indicating that the trip does not start or end at a stop; therefore, the trip does not start/end at any origin origin/destination and thus the trip trajectory does not correspond to an origin-destination trip but is instead a trip leg.

Therefore, the sample of OD trips included in INRIX does not correspond to the OD trip pattern for internal trips in the study area. Trips are composed of waypoints, GPS coordinates (given by longitude and latitude coordinates, as well as several important additional fields). Latency depends on the provider, but it is usually less than 10 sec in Barcelona's Metropolitan data – according to INRIX. Fields included for each waypoint register are: trip identifier, waypoint sequence, date, time, longitude, latitude, segment identifier, ZoneName, DeviceId, RawSpeed, RawSpeedMetric and LinkID. Building the working data matrix consists of determining the target population defined for the analysis, for which the data registers (instances) and attributes of this population will be kept. *Filtering* is devoted mainly to selecting subsamples from the main data matrix in

order to restrict the scope of the analysis and eliminate observations from other domains that are not targeted.

Since different behavior and traffic conditions are commonly assumed, the target population was selected according to the following methodological filters:

- A subset of trip registers pertaining to working days (728,060 out of 846,295 trips).
- A subset of internal trips to the first crown of Barcelona's metropolitan area (456,751 out of 728,060 trips).
- A subset of trips pertaining to private INRIX data consumers (245,728 out of 456,751 trips).
- Waypoint data for working trips (16,065,344 out of 61,925,267 waypoints).
- Removed attributes of trip data: Mode, IsStartHome, IsEndHome, ProbeSourceType, MultipleCorridors, MultipleZones, MovementType, OriginCbg, DestCbg, GeospatialType, ProviderType, ProviderDrivingProfile and VehicleweightClass. 16 columns were retained.
- Removed attributes of waypoint data: FRC, RawSpeedMetric. 10 attributes retained.
- Data types and levels for factors were recoded with meaningful labels for trip and waypoint data matrices.
- Trip travel times in minutes were calculated for working trips and stored in a new column of trip data matrix.

All the initially preserved columns were summarized using RStudio. The first summary indicated the missing values appearing for trip data under OriginZoneName, DestinationZoneName and for waypoint data under ZoneName, SegmentId and LinkId.

OriginZoneName and DestinationZoneName characteristics were imputed into the trip working data and ZoneName into the waypoint working data matrix. This was based on projecting onto the Transportation Analysis Zone (TAZ) a shapefile loaded in RStudio. 27,821 trips were removed due to unsuccessful matching of origin or destination in the TAZ. Intrazonal trips were also discarded, leading to **185,432 trips whose trajectories account for 13,005,532 waypoints**. Imputation of SegmentID and LinkID in waypoint registers was initially supported by the maptools RStudio package and snapPointsToLines function. XD-Segment shapefile by INRIX and VISUM-VML link shapefile were uploaded. After checking imputation results, network matching was not validated. Then, after several refinements, we continued to work with LinkID imputation because it still presented a lot of inconsistencies. PostGIS, was used to define map-matching of the nearest XD-Segment to a GPS track register (longitude, latitude, time), but the authors are not fully satisfied with the results.

Meanwhile, in order to prepare data matrices from GPS tracking data, we performed outlier detection for trip travel times, trip mean speeds and trip distances. We also analyzed the number of waypoints per trip, waypoint latency and number of trips per device. Large latencies make it difficult to identify the paths used in the network when

solving the network matching problem. Very short trips in terms of distance and time are not suitable for the goals of this work, as it focuses on OD spatial distribution stability over time and OD route selection.

Thus, they were removed from the working data set, as suggested by some authors (Montini et al. 2017). Some statistics about trip and waypoint were set up in the final working sample:

- **Trip distance:** More than 25% of the trips have a total distance of less than 1km and 5% are greater than 18km. Trip distance median is 2,490m. A right skewed distribution is observed. Only trips with a total distance between 1.5km and 24km are initial candidates for the working set. 70,264 trips are candidates to be either outliers or non-interesting trips for the purpose of the current work.
- **Trip Travel time (min):** Median is 9.61min, which is a really short trip duration; 2.5% and 97.5% percentiles are 3.75 and 74.51 min, respectively. A right-skewed distribution is found. A bivariate boxplot tool is used to discover some insights about atypical trip travel times and trip distances. Only large travel times might cause problems to the goals of this paper, the outlier detection procedure targets as potential outliers those trips whose durations are over 120min (less than 1% of the working sample, 536 trips).
- **Number of trips per device and waypoints per trip:** Median for number of trips per device is 1; 74% of the devices register just 1 trip and 95% of devices registered 8 trips or less. Latency (sec) between waypoints per trip. Working sample of waypoints per trip might be surprisingly low, percentiles are shown in Table 1 (a) (median is 27 waypoints per trip).
- **Waypoint latency:** Latency for GPS tracking in the working sample has a median of 5 seconds; percentiles are shown in Table 1 (b) (mean is 10.12 sec). 46,922 trips have a trajectory that includes some latency of greater than 3 min between waypoints, which we assumed to be a threshold for identifying the selected path.

Table 1. (a) Number of waypoints per trip. (b) Latency (sec) between waypoints per trip. Working sample.

Percentiles – Number of Waypoints per Trip – Working sample											
Prob.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Number	2	2	8	12	18	27	47	82	133	221	4,914

Percentiles – Latency between waypoints per Trip (sec) – Working sample											
Prob.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Seconds	1	1	4	5	5	5	5	5	5	10	3,373

The final working sample for obtaining an OD matrix contains 68,246 trips and 6,758,275 waypoints. Only 10,505 trips correspond to OD pairs that have more than 1 trip. Sparsity is common in OD matrices, but if we disregard the TAZ spatial resolution and consider instead a district in municipality resolution, then 73% of OD pairs have more than 1 trip while about 9% have more than 50 trips.

Since congestion level has to be controlled, a speed profile analysis was used to classify day-type and hour according to similar congestion. The next step consisted of aggregating trips in OD pairs between districts (in municipalities) pertaining to the same congestion pattern, then selecting those OD pairs containing more trips to address OD path preferences. In the 8 to 10 am period, only 22 OD pairs satisfy the condition of having more than 50 OD trips and they account for 1,086 total trips and 108,498 waypoints.

Once the pre-processing of GPS tracking data is systematized, the aim was to focus on the stability of non-adaptive path choice models between some selected OD pairs containing the largest number of trips. Examples such as Path Size Logit have been proposed in literature. Estimation of route choice parameters is addressed using *mlogit* package in R (2019).

A General Framework for route choice analysis based on GPS traces was defined:

- Filtering internal trips to the study area, non-fleet provider type and reasonable trip length.
- Filtering outliers on trip travel times and trip mean speed.
- Filtering trips with latency over 3 min.
- Map matching of waypoints to INRIX XD-Segments.
- Classification of trips according to day-type and hour based on speed profiles leading to the identification of clusters of trips according to similar congestion.
- Aggregation of OD TAZ trips to OD municipality-district trips within the same congestion cluster.
- Selecting OD pairs with the largest number of trips (10 OD pairs) within the same congestion cluster.
- Calculation of path size to identify OD trips with common paths. Define OD path choice set.
- Calculation of OD path choice set variables and observed OD path proportions.
- Estimation of random utility model for OD path choice.

5. CONCLUSIONS AND FUTURE RESEARCH

The 2017 OD matrices that were elaborated for modelling purposes from mobile phone CDRs by NOMMON were available in a detailed zoning system (VML-TAZ) for the Primary Crown of Barcelona. The hourly OD matrices for 2017 were successfully checked for consistency against the available official sources. A modal splitting procedure was applied to obtain modal matrices, and it was also successfully validated. An innovative

analysis of temporal and spatial relationships was been applied. Although PCA (Principal Component Analysis) and CA (Correspondence Analysis) are not new methods, they have not been applied previously to demand analysis, and they are very promising to understand mobility patterns in large areas.

GPS traces for one month in the selected study area contain a large amount of trip and waypoint registers, the proposed methodology drastically reduces trip samples and OD choice set of paths are usually very small. The research has found to be extremely difficult to fulfill the ambitious initial objectives of the research, due to data preparation required time and limited sample size. GPS tracking data for a longer period of time is required. GPS tracking data is an innovative source that must be explored further, but traditional survey sources prove to deliver remarkable benefits in terms of direct use, although there are disadvantages regarding cost and preparing the data collection.

The origin-to-destination (OD) estimation problem is an underdetermined problem that, depending on the used seed OD matrix, could lead to the resulting OD matrices fitting traffic counts but losing the OD trip pattern from available historical matrices. We focused on reducing such underdetermination using new ICT traffic measurements and improving the quality of the estimated matrices in our research.

The aim of our current and future research is to analyse the daily mobility patterns in the Metropolitan Area of Barcelona, focusing on gender aspects. In the light of the changes needed to undertake due to climate change, the results show that understanding gendered mobility patterns is fundamental to design transport and urban policies for a green and just transition.

The spatial arrangement of a metropolis is of utmost importance to carry out daily activities, which are constrained by space and time. Timely access to the places where these activities, jobs, services, markets, social interaction etc., can be realized is of essential interest for people that must access them, and it is the main objective of persons' mobility, and the ultimate justification of the transport system. Accessibility is usually enabled by the available transportation system.

However, accessibility is not only shaped by the spatial and temporal dimension, individual characteristics shape citizens' decisions regarding access to places. There is a wide evidence that transport is not gender neutral, it is usually biased to men's needs in the way it is planned and implemented. To address the objectives, it is necessary:

- Get deeper insights in female mobility patterns; but to get such insights we must move from a qualitative to a quantitative understanding on the why and how it happens (extending previous research, Mejía-Dorantes et al. (2021).
- Analyze the different mobility patterns in terms of fragmentation of activities unveiling travel behavior dependencies on socioeconomic, societal and political developments (McBride et al. 2020) as well as on gender issues (Goulias, 2020).

To carry out this study, we made use of EMEF 2018 to 2021 working day mobility surveys by ATM (Transport Authority in Barcelona Metropolitan Area). New transport data sources open promising possibilities for applications in specific sectors as tourism-based applications.

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Metaverse and smart tourism: a fad or a new industry reality

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ABSTRACT

The metaverse is widely recognized as the next big thing in marketing and customer experience. Tourism is about immersive, meaningful and sensory-filled experiences, all characteristics that lend themselves well to the metaverse affordances. Driven by demand and pushed by industry investments, the metaverse is not a science fiction but the new tourism industry reality. This presentation discusses how the affordabilities of metaverse (including digital twins, NFTs, avatars, immersive experiences, user agency and interactions) empower a new era of smart tourism. Several examples of metaverse business models and marketing applications will be provided showing how the metaverse can enable new opportunities for enriching the tourists' experiences, empower local communities and boost digital entrepreneurship, and support a more sustainable and responsible tourism.

1. INTRODUCTION

The metaverse is no anymore a science fiction but the new industry reality of tourism. According to (McKinsey, 2022), 35% of travel companies have a strategic metaverse plan, while virtual tourism experiences are one of the most highly sought experience by metaverse users. Similarly, tourism destinations of all levels (e.g. attractions, cities, countries such as Disney theme parks, natural parks, Seoul, Dubai) already have or plan to have their digital twin and conduct many destination management and marketing activities in a metaverse world. Overall, the metaverse is envisioned to transform the way we experience and practice tourism as a social practice as well as the way tourism is provided, managed and promoted as a business and economic activity.

Literature in metaverse tourism has started to boom (e.g. Koo et al., 2022; Buhalis et al., 2022; Gursoy et al., 2022; Sigala in Dwivedi et al., 2023), but it is still in its infancy and tends to be very descriptive heavily focusing on current metaverse applications. However, as the metaverse is continuously and dynamically formed by technological advances and human creativity, most of its applications and implications in society and the economy are still unknown and impossible to foresee (Ball, 2021). Nevertheless, there is an urgency to identify how it frames and enables opportunities in tourism, what challenges these applications entail and so, what questions tourism research should investigate to contribute to this important but fluid phenomenon.

To contribute to this debate, I analyse below the opportunities and challenges created for tourism and tourism stakeholders in three major areas: metaverse enabling

technologies and tourism; metaverse tourism management and marketing; and metaverse tourism experiences. In doing this, I also identify research questions to inspire and guide future research in metaverse tourism.

2. METaverse ENABLING TECHNOLOGIES AND TOURISM

The metaverse is a virtual shared space created by numerous (netware, software and hardware) technologies that can enable the convergence of virtually enhanced physical reality and physically persistent virtual space. In other words, the metaverse includes the sum of all virtual worlds and immersive technologies (VR, AR, MR and XR), which in turn affords numerous ways in which the metaverse can influence tourism. However, there is still limited discussion in the tourism literature in terms of how the metaverse technologies and functionalities can shape and form various scenarios in which the metaverse redefines and transforms tourism as a social practice and activity. In replicating past research, Koo et al. (2022) identified various examples of metaverse tourism scenarios based on a model developed in the generic literature, e.g. metaverse tourism environments related to mirror worlds, virtual worlds, lifelogging and augmented reality. However, metaverse tourism needs to go beyond the simple replication of metaverse scenarios in other industries and settings, consider the particularities of tourism as an experience and industry, and develop creative and innovative ways in which metaverse technologies can revolutionise tourism and also, inspire other industries and settings.

Other major metaverse enabling technologies with huge applications and transformative potentiality in tourism include: avatars, holograms, digital twins, cryptocurrencies and NFTs. Tourists, tourism firms, tourism destinations and other tourism stakeholders (e.g. influencers, artists and events' performers) navigate, experience and interact with other users of the metaverse by creating their avatars. In developing their avatars (e.g. physical appearance), users usually try to (re)-create their real or ideal-self, while avatar technologies (e.g. machine learning and computer vision) are developing, enabling avatars to also mimic and resemble the body language and movements of their human representatives. The latter entails many implications and challenges such as: how tourism firms and destinations can design and manage avatars that represent the values, image and personalities of their brands; what biodata and big data tourism firms and destinations can collect and analyse from metaverse users to better understand and meet the needs, behaviours and expectations of their tourists. Apart from business challenges, metaverse tourism also creates ethical questions and dilemmas such as: can destinations re-create and make alive (through an avatar or holograph) a dead person such as a member of staff, a destination celebrity/hero, to promote the destination and offer metaverse tourism experiences; who is the owner of the avatar and its data when its human representation pass away and can/should tourism firms use the former?

Similarly, cryptocurrencies and NFTs create numerous opportunities but also challenges for tourism entities. For example, tourism attractions and destinations can create digital twins of their tourism resources (e.g. performances of a festival, the architecture of an icon building/heritage site), develop collectables of these digital twins in the form of NFTs and sell or give them to tourists as souvenirs of their tourism experience. Metaverse tourists owners of these NFTs may be able to use them to decorate their metaverse homes, cloths and/or resell them to make money. This metaverse scenario shows how NFTs and digital twins change the concept of (psychological/physical) ownership, possession, consumption and trade of tourism resources, creating numerous challenges in terms of IP, copyright issues. Subsequently, future research should look beyond the business applications of such technologies but also the legal, ethical and marketing challenges created by NFTs such as the fragmentation of ownership and IP rights of tourism resources and assets.

Metaverse tourism is facilitated and inhibited not only by technological advances but also by the adoption and diffusion rate of these technologies within the tourism industry and stakeholders. Technology adoption may create huge inequalities and disparities and so, metaverse tourism research should also critically investigate and address issues such as: factors influencing technology adoption by tourism stakeholders; how to address the digital divide in metaverse tourism; and how to ensure a better representation of tourism stakeholders in the metaverse.

3. METaverse TOURISM MANAGEMENT AND MARKETING

Metaverse technologies enable tourism stakeholders and destinations to create digital twins of their tourism resources, assets and infrastructures such as cities, heritage sites, airports/ports, museums, festivals and events. Digital twins provide numerous opportunities to develop, offer and promote metaverse experiences of virtual events and places. Destinations can enable visitors to experience a place and an event before travelling to it, allow people with disabilities to experience places to which they cannot travel, empower real visitors to experience and see things at destinations that they are not able to see (e.g. how a destination was and looked like in the past, historical events taken place in augmented reality at a heritage site).

The opportunities of digital twins are not limited to tourism marketing, but they can revolutionalise and transform business practices across the whole value chain. Analytically, digital twins can be used for the design and pilot testing (product innovation-design stage), the management and the sustainability of tourism resources, assets and infrastructure. For example, festivals can use digital twins to design and test their festivalscape design and sports events and cities use digital twins to monitor and manage traffic, visitors' flows, use of energy and other resources in real-time. Digital twins of heritage sites can also contribute to their digital preservation and augmentation.

4. METAVERSE TOURISM EXPERIENCES

Metaverse settings create immersive and persistent environments that enable users to live very interactive, collaborative, scalable and ubiquitous experiences that have continuity of data, such as identity, history, possessions, objects, communications and payments. Preliminary research in metaverse tourism has examined how the metaverse influences tourism experiences by using existing approaches and frameworks. For example, Gursoy et al. (2022) advocated studying metaverse experiences based on their functional or hedonic dimension (types of experiences values) or the level of their interactivity. Sigala (in Dwivedi et al., 2022) proposed opportunities for creating and supporting tourism experiences along the customer journey i.e. before, during and after the trip.

However, as explained earlier, the metaverse creates a new and uncharted world that is totally different from our current knowledge and experience of the internet and/or other virtual environments. For example, technological advances like the Internet of Place (shared virtual experiences) and Internet of Ownership (verifiable digital identities) create multi-technological spaces that have never been investigated before (Accenture, 2022). Users/tourists do not get access to the metaverse, but they live in the metaverse and the metaverse evolves and continues even without their 'presence'. This means that current theoretical concepts and approaches may not be sufficient to allow us to understand but also design (tourism) metaverse experience. For example, research has shown us how to use technology to create sensory immersion in virtual worlds, but we know nothing about how to generate social, psychological or even spiritual immersion in the metaverse, e.g.: what makes people to feel close to each other within the metaverse? How does it feel not knowing what is happening in the metaverse while not being there or knowing that your avatar is experiencing what you should be experiencing? How do you feel and what does it mean for an avatar to walk through your avatar? Is that sexual harassment or not? What quality of service interactions mean in metaverse tourism settings?

Moreover, research needs to investigate both the value co-creation as well as the value co-destruction (Sigala, 2018) possibilities and impacts of the various interactions between the metaverse-scape and the avatars and other digital agents representing various entities (such as tourists, brand ambassadors, destination managers and heroes). For example, negative effects such as digital sickness, technostress, security and privacy violations, dehumanisation and depersonalisation of tourist experiences are only some of the potential impacts of metaverse experiences significantly affecting the digital well-being of its users. Although research in digital well-being has started (Stankov & Gretzel, 2020; Stankov & Gretzel, 2021), we still know nothing about it within the metaverse and physical settings.

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BOOK OF ABSTRACTS

Smart Museums: definition and presentation of a smart management model for museums

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ABSTRACT

The appearance of smart models for tourism management has contributed towards a more efficient administration of tourism products. However, museums are institutions that have not been explored from this angle and possess great potential for their application. Although plenty of museums are adapting their facilities and experiences through a digital transformation, there are none that adopt the Smart designation for their description, nor base their operation on existing literature on smart management. Considering this context, the present research aims to put forward a proposal of a Smart Model for museum management and to define the main characteristics of a Smart Museum. To answer these objectives a qualitative methodology approach is used. In this sense, a focus group with experts in museology, smart management and heritage innovation was carried out aiming to identify the main components for smart management to take place in a museum setting. Data were coded using qualitative analysis software HyperRESEARCH, which allowed the development of a mixed thematic analysis (inductive and deductive), focusing on the principal elements discussed in the group meeting. Findings showed the absence of a clear definition for a smart museum. Nonetheless, the contributions from the focus group, together with the findings from the literature review on existing smart models provided the necessary concepts to establish a definition and build an application model adapted to museums. In this sense, this article contributes to the present state of the art by defining clear dimensions on which to reflect to promote more sustainable and efficient museum institutions through the use of technology. Besides, it also provides key aspects and strategies to enhance the quality of visitors' experience.

Análisis de la representación visual de Facebook como estrategia de promoción turística del Smart Tourism de las DMOs en México

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RESUMEN

Investigaciones recientes sobre el Smart Tourism lo clasifican como una tendencia emergente. En este sentido, propusieron un modelo conceptual para el “Smart tourist”, donde destacan que el uso de las Tecnologías de la Información y Comunicación (TIC) contribuyen a vivir experiencias turísticas significativas. Estudios de Anaya y Lehto, demuestran la importancia del rol a partir de las actitudes y comportamientos del turista como un camino para la transformación inteligente del sector.

Respecto a la formación de la imagen del destino turístico, las redes sociales forman parte de una estrategia de agrupación de países y una herramienta eficaz para tal propósito. Sin embargo, se observa que las Destination Management Organizations (DMOs) no aprovechan todo su potencial. Las redes sociales no solo afectan la decisión del turista de visitar o no un lugar, sino también, la representación visual juega un papel importante en el posicionamiento del destino.

La presente investigación tiene como objetivo analizar las estrategias de representación visual, la frecuencia de publicación y la estacionalidad, que utilizan cinco DMOs de México: Ciudad de México, Oaxaca, Puebla, Quintana Roo y Yucatán, a través de las fotografías publicadas en Facebook como herramienta de promoción de sus destinos turísticos.

Con el fin de seleccionar las DMOs de los estados de México donde se aplicaría el estudio, se realizó una investigación previa, que consistió en el análisis de contenido de una muestra de 524 fotografías recogidas de la página oficial de Facebook de “Visit México”, durante el periodo de enero del 2020 a marzo del 2021, año de la pandemia. Los hallazgos indican que los cinco estados que más se promueven a través de las fotografías que se proyectan en “Visit México” son Quintana Roo, Ciudad de México, Yucatán, Puebla y Oaxaca.

Posteriormente, se analizaron las fotografías publicadas en las páginas oficiales de Facebook de las DMOs seleccionadas, incluidas de marzo de 2019 a marzo de 2022. Luego se creó una base de datos con el material fotográfico recopilado durante los 3 años, primero se examinó y contrastó la frecuencia de las fotografías proyectadas con el flujo turístico de cada estado. Segundo, las fotografías fueron codificadas mediante análisis de contenido, enseguida cuantificadas, con el fin de identificar si las DMOs proyectan mayoritariamente fotografías de los destinos propiamente dichos, o contenidos de publicidad e interés local.

Los resultados mostraron principalmente una incongruencia entre la frecuencia con que las DMOs realizan sus publicaciones de Facebook y los meses de mayor flujo turístico, lo que indica una falta de uso estratégico de sus redes sociales. Además, se encontró que el estado con la estrategia más amplia y sólida, es Oaxaca, ya que cuenta con una página de Facebook dedicada a sus visitantes, donde se publican fotografías de alta calidad, con una frecuencia coherente, representando el destino, así como las actividades disponibles. Por su parte, Yucatán resultó ser el estado con una estrategia más integral en Facebook ya que en el 2021, durante la pandemia, implementaron dos campañas a lo largo de los 365 días de año donde, además de mostrar los destinos turísticos del estado, también presentan las experiencias que el visitante puede disfrutar.

Las implicaciones prácticas de este estudio para las DMOs consisten en revalorar la importancia y utilidad de Facebook como una herramienta estratégica de promoción y comunicación para el Smart Tourism, ya sea en periodos de crisis o en fases de cierta normalidad.

El estudio destaca la importancia de la representación visual de los destinos a través de las redes sociales como parte del fenómeno del Smart Tourism. Además, presenta una metodología que, en el futuro, podría ser aplicada en otros países o destinos, ya que el contenido visual y las fotografías se están convirtiendo en el nuevo paradigma en el turismo y de la comunicación.

¿Dónde se ubican las viviendas turísticas? Factores explicativos para su geolocalización

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RESUMEN

Las investigaciones centradas en el análisis espacial de la oferta de destinos urbanos y sus impactos normalmente están relacionadas con la gentrificación, turistificación y mercantilización de la vivienda. Con respecto a estos últimos, buena parte de ellos únicamente analizan la distribución de la oferta o prestan más atención a variables demográficas, dejando en un segundo plano o sin incluir aquellos factores relacionados con la localización de estos alojamientos. De hecho, esta escasez de estudios al respecto también es extrapolable al resto de establecimientos de alojamiento, a pesar del importante papel que desempeñan en la creación y transformación urbana de los destinos turísticos. Con respecto a las viviendas turísticas, los escasos estudios sobre factores de localización se centran en variables como la distancia al centro histórico o atracciones turísticas; el acceso al transporte público; o la accesibilidad y el medio ambiente urbano a través del índice de caminabilidad y el nivel de peatonalización proponen un modelo para medir que factores son los más influyentes en la localización de la vivienda turística.

En base a ello, el objetivo principal de esta investigación es analizar cuantitativa y espacialmente la oferta de viviendas turísticas para identificar patrones espaciales de localización. La metodología se fundamenta en el análisis de la distribución espacial de las viviendas con fines turísticos (VFT) a partir de un conjunto de factores de influencia del entorno construido que determinan sus patrones de localización. La ubicación de las viviendas será obtenida a través de la técnica web-scraping, tomando como base de datos para ello las inscritas en el Registro de Turismo de Andalucía (RTA) y las anunciadas en las plataformas P2P (Airbnb, Booking, Homeaway y Tripadvisor). En primer lugar, para conocer la evolución de su distribución, se analizará la expansión de tales viviendas tomando como periodo comparativo los años 2016 y 2021.

Posteriormente, respecto a los patrones de localización, se estudiará la relación entre la distribución actual (2021) y los siguientes factores de influencia: Cercanía de atracciones turísticas icónicas, Proximidad a los nodos de alta accesibilidad (aeropuerto, estaciones de tren y bus), Integración local de la vía de acceso de las VFT; Cercanía a atracciones de restauración (restaurantes, bares, cafeterías, locales de comida rápida, pubs, clubs), y Concentración de establecimientos alojativos con respecto a las VFT.

El análisis de dichas variables se llevará a cabo a través de diferentes técnicas como el Space Syntax y el uso de Sistemas de Información Geográfica (SIG). Este proceso

metodológico se llevará a cabo en la ciudad de Sevilla donde actualmente existen 7.317 viviendas con licencia VFT con una capacidad de alojamiento de 35.717 plazas. El patrón de localización es de alta concentración y saturación en el Centro Histórico, marcado por la cercanía a las atracciones turísticas (patrimoniales, de restauración, etc.), la accesibilidad y las principales vías de comunicación, está provocando una expansión de las VFT hacia los barrios periféricos.

El estudio de la distribución espacial de los alquileres turísticos, así como su análisis estadístico y representación cartográfica son herramientas necesarias para comprender el comportamiento turístico y para la toma de decisiones. De este modo, el análisis de los factores del entorno que influyen en la ubicación de alojamientos son de gran interés tanto para la planificación urbana y turística, pues permite actuar sobre determinadas áreas urbanas donde existe una gran presión turística.

IoT as a factor for improving the tourist experience of a smart destination

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ABSTRACT

The notion of smart destination seems to be gaining popularity with several territories, even if the concept is not yet well defined. The race to become a smart city or destination follows several trajectories, however, the arrival of the COVID-19 pandemic has slowed down several initiatives that have been launched in recent years. In this context, this research focuses on the case of the city of Montreal, Canada, designated in 2016 as the best smart community in the world, and more particularly on a techno-historical application that aims to promote the history of the city.

The objective of this project is to identify the mechanisms in place that make it possible to better configure the components of the visitor's experience of an outdoor techno-historic circuit within a historic and touristic neighbourhood. More specifically, this part of the research aims to understand the flow of visitors during the projection of video tableaux on buildings, in the public space, with regard to the viewing conditions of the surroundings.

Along with the promoters of this application, the research team installed sensors on 3 of the 22 projection sites in order to understand the behavior of visitors in terms of arrival and departure from the projection site and the viewing time, all that with regard to the different days of the week, the time of viewing and the exterior and ambient conditions of the selected site. The data collected consists of an RFID signal emitted by all smart objects found in the screening area. Through a complex data cleaning process, only the ones associated with the techno-historic visitors are kept for analysis purposes. Subsequently, other layers of data were added to the analysis to integrate other contextual factors such as weather conditions, sanitary conditions and the day of the week.

Results of the data collected showed that the number of visitors varies according to the duration of screening. As such, it was found that only 7% of visitors spent between 3 and 5 minutes observing the tableau, while the average screening time of the tableaux of the present study is 7 minutes. Among other findings of the study, it was noted that Friday and Saturday evenings were the busiest (about 50% of visitors), while the number of visitors during weekdays was less than 35%. Regarding contextual factors, results show that relative humidity and the level of precipitation negatively influence the number of visitors, unlike the increase in temperature, while the intensity of the wind seems to have no influence on the volume of visitors. Finally, in regard to the Covid19 pandemic, the severity of the health situation (measured through the moving average of deaths over the past 7 days) seems to have a negative relation with the number of visitors even if the screenings took place in an outdoor open space.

On a theoretical note, the question of collaboration between the different stakeholders of a smart destination are important. The example of Montreal in History demonstrates how the lack of data sharing between actors (e.g. work carried out by the city of Montreal) can have a negative impact on the user experience. From a managerial point of view, several challenges arise to better understand the visitor's experience when using visitor flow data to study it. Collecting data from sensors on a site or from the mobile application dedicated to the specific screening of historical tableaus remains a complex process with several limitations. The ultimate objective remains to enhance the visitor experience with regard to the optimal projection time, the presentation of content that takes into account the profile of visitors and the characteristics of the chosen sites.

L'experiència gastronòmica dels restaurants de cuina catalana a la Destinació Barcelona

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RESUM

La gastronomia s'ha convertit en un element clau per al màrqueting, ja que aquesta ajuda al posicionament estratègic i a la formació de la imatge de la destinació). A la vegada, la creixent demanda per part dels turistes de productes i experiències autèntiques i, el sorgiment de noves destinacions competitives, empenyen a la diferenciació com a estratègia. En conseqüència, entre d'altres estratègies per a la diferenciació, la posada en valor dels aliments es mostra com una una estratègia valuosa i ofereix un avantatge competitiu pel que fa a la competència. Això és així perquè la gastronomia local és un atractiu cultural que motiva activitats o desplaçaments per a un segment important dels visitants.

Els visitants sovint cerquen informació i assessorament per conèixer l'oferta d'experiències turístiques i prendre decisions de viatge. Diversos autors remarquen la importància del traveller-generated content (TGC) a través de l'electronic word of mouth (eWOM) és a dir tot el contingut que els individus creen principalment en blocs i ressenyes en diferents plataformes online, també conegut informalment com el boca-orella electrònic. Actualment, l'eWOM constitueix una font clau d'informació pels turistes, que solen triar experiències i destinacions segons la informació que troben mitjançant. Igualment tant l'eWOM com el TGC són menys controlables pels DMO. No obstant això, els DMO no haurien de prescindir de la influència de l'eWOM i haurien de valorar periòdicament el seu contingut.

L'objectiu d'aquest estudi és aprofundir en la comprensió per parts dels turistes de l'experiència gastronòmica en els restaurants de la província de Barcelona que ofereixen cuina catalana. La província de Barcelona, coneguda com Destinació Barcelona, reconeix la gastronomia com un recurs turístic important i que es pot conèixer especialment en els restaurants. La Diputació de Barcelona és l'entitat pública que gestiona la província i ha catalogat certs aliments com a Productes Singulares, que representen la tradició i la singularitat gastronòmica del territori.

Per a donar resposta a aquest objectiu, la recerca va consistir en seleccionar, a data de març del 2022, totes les opinions de 283 restaurants de cuina catalana de Barcelona ciutat i regió seleccionats segons un mostreig aleatori estratificat.

Per a l'anàlisi s'han obtingut un total de 67.262 ressenyes entre 2017 i 2022 escrites en anglès, francès, català i castellà a la plataforma TripAdvisor. Per a l'anàlisi s'ha considerat, d'una banda, classificar cada ressenya en positiva, negativa o neutra, així com, d'altra banda, en realitzar una categorització deductiva de les ressenyes segons els atributs que

hi apareixen, considerant la taxonomia proposada per Lei i Law (2015). Així, aquests atributs són: ambient, menjar, servei, valors, altres. També s'ha desenvolupat un estudi empíric, que conté informació sobre, l'evolució del nombre de comentaris publicats a TripAdvisor, la valoració quantitativa dels restaurants, segons el territori o l'ús del mòbil o altres eines per realitzar aquestes valoracions.

Els resultats empírics mostren una satisfacció positiva general amb la gastronomia dels restaurants de cuina catalana de la Destinació de Barcelona. No obstant això, l'anàlisi qualitatiu ha permès observar que els productes gastronòmics millor valorats i més citats no són propis de la cuina catalana, ni tampoc els considerats com a Productes Singulares per la DMO de la destinació.

Smart cities and people: ¿Does human involvement lead to better smartness of cities?

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ABSTRACT

Continuously escalating urbanization trend has resulted in a growing population in metropolitan areas. The outcome of such a trend can be perceived positively and negatively. As for advantages, urban areas are considered the backbone of world economies and their development. For example, 85% of Europe's GDP is generated in cities (UN SDG, 2019). Alas, the increasing population in cities also has its downsides. The issue of overcrowded urban areas, caused by tourists flows, is a source of challenges that cities go through. The excessive use of resources (e.g. water, land, energy), overproduction of waste, pollution, congestion also create many risks for cities. To address the above-stated issues, the concept of smart cities has been introduced which was initially intended to advocate for better use of resources, contribute to sustainable development in the cities, and increase the quality of life.

The debates around smart cities and their emergence have attracted the circles of scholars coming from different disciplines, including tourism and hospitality. The evolving progress of advanced technologies has facilitated the development of smart cities, thus, the majority of scholars oftentimes define smart cities as high-tech or cities with advanced technology. Nevertheless, there is an evident skewness to the technological aspect ignoring the social component and interests of people residing in and visiting cities as tourists. The term "smartness" comprises both technological excellence and people-centricity in cities, where the last is the least explored.

Therefore, the goal of this paper is to elaborate on social engagement practices and the importance of human involvement in smart city development. The previous studies revealed that it is crucial to investigate the notion of smart cities from the social prism which hasn't been researched enough. Therefore, the present research aims to explore the city performance indicators to measure the level of human involvement in smart cities. To address this goal, the following two research hypotheses have been formulated:

H1: There is a strong association between human involvement and quality of life

H2: The performance of smart cities is highly influenced by human involvement

This study is characterized as quantitative research, where 103 smart cities from 37 countries have been analyzed based on the existing smart city indexes. As a further attempt, this study combined different indicator sets to measure the performance

of selected smart cities and identify the value of human involvement. The other city performance indicators that have been additionally added are the human development index by UNDP, GDP per capita, environmental performance index, e-government development index, e-participation index, social mobility, life satisfaction, happiness, SDG, Hofstede's cultural dimensions, and recently introduced travel & tourism development index by UNWTO. The data has been analyzed using R Software with open-source packages through descriptive statistics, robustness tests, correlational statistical analyses, and ANOVA tests.

Based on the results, the rationale of human involvement and its direct influence on smart city development has been explained. According to the findings, for more effective human development, it is important to form communities within cities. Also, the study revealed that active human involvement strongly affects the governance of cities and their further development, which supports the idea of engaging communities for developing smart city solutions. Finally, cities are formed by people that possess cultural specifics which should be taken into consideration. The research results contribute to support relevant smart city players to improve smart city development through human involvement and boosting social engagement. The results of this study could be useful for understanding the smartness in cities from a social prism and the preliminary results of this study can be used for further research agenda by both academics and practitioners in the field.

L'aplicació del Sistema d'Indicadors de turisme per a la gestió sostenible de les destinacions de la província de Barcelona al Vallès Oriental

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RESUM

La mesura de la sostenibilitat s'ha convertit en un element clau per a la gestió turística d'un territori. Actualment, existeixen diversos sistemes d'indicadors creats per a aquest fi, on la Diputació de Barcelona ha participat, directa o indirectament, en la seva elaboració, testatge o execució. L'objectiu d'aquest article és analitzar el recorregut de la Diputació de Barcelona fins arribar al sistema d'indicadors d'àmbit comarcal del Vallès Oriental i determinar les properes passes en l'aplicació dels sistemes d'indicadors en l'àmbit local.

L'any 1987, la Comissió Mundial sobre el Medi Ambient i el Desenvolupament, definia el desenvolupament sostenible com aquell desenvolupament que és capaç de satisfer les necessitats i aspiracions del present sense comprometre la capacitat de satisfer les necessitats futures. En aquest sentit, les Nacions Unides han anat elaborant campanyes com els 8 Objectiu de Desenvolupament del Mil·lenni (ODM) o els 17 Objectius de Desenvolupament Sostenible (ODS), que incorporen sistemes d'indicadors per a la mesura de la sostenibilitat i l'avaluació del grau de compliment dels objectius marcats. A partir d'aquí, han anat sorgint diferents programes i projectes relacionats amb la mesura de la sostenibilitat.

El LABturisme de la Diputació de Barcelona, l'any 2015 va publicar un sistema d'indicadors de turisme sostenible propi, com a part d'un prova pilot per a l'European Tourism Indicator System. Posteriorment, (l'any 2019), va actualitzar aquest sistema d'indicadors, creant el SIT-DIBA. Aquesta actualització, va permetre obtenir un anàlisi evolutiu dels indicadors per a un període de 5 anys.

Seguint aquesta pauta, algunes destinacions de la província de Barcelona també han començat a treballar els seus propis sistemes d'indicadors, d'entre els quals es troba el Sistema d'Indicadors de Sostenibilitat Turística (SITS-OTB), o el Sistema d'indicadors per a la gestió sostenible del turisme al Vallès Oriental, els quals han utilitzat el SIT-DIBA com a sistema de referència, entre d'altres, adaptant-lo a les característiques i necessitats del seu territori.

El Sistema d'indicadors per a la gestió sostenible del turisme al Vallès Oriental, consta d'un conjunt de 26 indicadors organitzats al voltant de les tres dimensions de la sostenibilitat (econòmica, sociocultural i ambiental).

Aquest projecte sorgeix amb l'objectiu de disposar d'una base d'informació prèvia a la pandèmia, per tal d'encaminar, amb coneixement suficient, una recuperació sostenible, aconseguint una major competitivitat per a la destinació turística. Per a l'elaboració del sistema es parteix del SIT-DIBA i l'ETIS, escollint els indicadors més apropiats per a la comarca del Vallès Oriental, en funció dels criteris següents:

- El grau de sostenibilitat del turisme al territori.
- Les accions de les administracions locals del Vallès Oriental.
- La disponibilitat de les dades, tant a àmbit comarcal com municipal.
- La facilitat a l'hora d'obtenir aquestes dades de les diferents fonts disponibles.

Del total de 26 indicadors, 16 provenen del SIT-DIBA i un de l'ETIS. Els 9 indicadors restants s'han creat nous, inspirant-se en els indicadors dels dos sistemes anteriors, adaptant-los en funció de la disponibilitat real de dades de la comarca i dels municipis. Les principals conclusions que es deriven d'aquest projecte són:

- La manca de disponibilitat de dades dificulta el càlcul d'alguns indicadors, però cal prioritzar les fonts d'organismes regionals i autonòmics.
- Existeix un alt cost tècnic i econòmic derivat de la recollida d'informació i el càlcul d'indicadors, per tant s'han de prioritzar indicadors.
- L'aplicació del sistema s'ha de fer de manera personalitzada, donada la realitat de cada destinació.
- La Diputació de Barcelona ha de continuar tutelant la incorporació de la sostenibilitat en la gestió de les destinacions.

Innovación y tecnología como variables clave para el futuro de las oficinas de turismo

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RESUMEN

Las oficinas de turismo han sido históricamente un elemento esencial en el ciclo de viaje del visitante cuando aterriza en un nuevo destino, pero el cambio de paradigma provocado por la pandemia, la digitalización y los nuevos hábitos de consumo de la sociedad que se replanta su papel y funciones.

Este artículo se basa en un estudio sobre talleres de turismo basado en 6 indicadores y 38 variables clave por comprensión.

A fin de cumplir con este objetivo se ha llevado a terminar una investigación en dos fases. En primer lugar, se ha estudiado la teoría existente en materia de competitividad de oficinas de turismo. En segundo lugar, se ha llevado a cabo una investigación de campo en tres etapas; un focus group con 6 profesionales del sector entre los que se encuentran representantes de la administración pública, consultores turísticos y expertos en viajes, 376 encuestas a usuarios que quieren obtener una visión de las necesidades reales del visitante y una comparativa entre 6 talleres de turismo para identificar interesantes oportunidades y tendencias que ya están a punto de terminar. Tanto el focus group, como las encuestas como la comparativa se han centrado en los 6 indicadores que son; alojamiento, accesibilidad, comercialización, servicios, tecnología - innovación y sostenibilidad así con las variables asociadas a cada uno de ellos.

Los resultados del estudio concluyeron cinco de los indicadores más interesantes a partir de los que construiríamos los futuros talleres de turismo. Aquí mismo se propone un modelo para calcular la competitividad de los talleres de turismo a partir de los elementos anteriores esbozados y un manual de buenas prácticas a aplicar para obtener millones en los talleres de turismo del futuro. Tanto el cálculo de competitividad como el manual de buenas prácticas se aplican con el ejemplo en los talleres de turismo de Sitges

La Generalitat de Catalunya contra Airbnb: un estudi de cas sobre la urgència de la transversalització de l'administració pública

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RESUM

El control de l'oferta d'allotjament turístic és una mesura essencial per influir en la gestió de les destinacions turístiques i les seves polítiques, permetent incidir en aspectes com l'afluència de visitants d'un territori. Tot i això, actualment, existeixen empreses de comercialització d'allotjament turístic que en cap moment garanteixen la cobertura legal dels establiments anunciats. Davant d'aquesta realitat, les administracions públiques, en el cas que ocupa aquest estudi; la Generalitat de Catalunya, no tenen eines per regular aquestes activitats, amb el marc normatiu vigent. L'objectiu de la comunicació és explicitar la necessitat d'una regulació unívoca a l'hora d'adreçar activitats tan transversals com la turística, per tal d'influir positivament en la sostenibilitat del model de governança de les destinacions intel·ligents.

Així, el present document exposa un estudi de cas sobre la resolució de la sentència STS 6/2022, dictada el gener del 2022, on estan implicades l'empresa Airbnb i la Generalitat de Catalunya. Com a antecedents, l'any 2014, la Generalitat va endegar un procés judicial contra Airbnb per obligar-la a eliminar de la seva web tots aquells establiments d'allotjament turístic que no mostressin el número d'inscripció del Registre de Catalunya. Aquest procés ha avançat amb recursos interposats a les diferents administracions competents, fins arribar a la darrera sentència (STS 6/2022). Aquesta, finalment, ha resultat que Airbnb no és una empresa turística, sinó una empresa d'intermediació, prestadora de serveis de la societat de la informació (subjecta a la regulació de la Directiva 2000/31/CE, de Comerç Electrònic i l'àmbit coordinat i a la Llei 34/2002) i, per tant, no ha de seguir la normativa marcada per la Llei 13/2002 de Turisme, malgrat que la pròpia sentència reconeix que l'activitat d'aquesta empresa és d'intermediació en el sector del lloguer d'allotjaments de vacances.

Per al cas que exposem, per una banda, la Llei de Turisme defineix com a empreses turístiques les empreses de mediació, concretament, les intermediàries en els serveis turístics d'allotjament, catalogades com a prestadores de serveis de la societat de la informació. Aquesta llei dicta que l'empresa intermediària té la responsabilitat de garantir que tota l'oferta publicada al seu portal incorpori el número de registre turístic. Per altra banda, la Directiva de Comerç Electrònic dicta que les empreses d'intermediació no tenen l'obligació de supervisar les dades incorporades a la seva plataforma, ni de buscar-ne irregularitats.

A més a més, se'ls exigeix de tota responsabilitat sobre la informació que s'hi publica, a petició de l'anunciant. En aquest escenari, la normativa de comerç i la normativa turística regulen una mateixa activitat, la intermediació, amb lleis contradictòries. Mentre que la Llei de Comerç regula la intermediació de manera genèrica, la Llei de Turisme la contempla quan es tracta de serveis turístics d'allotjament. Així doncs, en cas de conflicte, és el poder judicial qui acaba decidint, en cada plet, quin marc legislatiu prima per sobre l'altre.

Davant d'aquesta descoordinació en la regulació d'una mateixa activitat que afecta a diferents sectors econòmics, la present comunicació defensa la necessitat d'una harmonització per tal d'adaptar el marc legislatiu al dinamisme i a la transversalitat de les diferents activitats econòmiques, entre elles la vinculada al turisme. El cas d'estudi exposat mostra com la manca d'harmonització dels diversos marcs legislatius que es troben en interacció, comporta una dificultat afegida a la gestió del turisme. D'aquesta manera, cal que les regulacions dels diferents sectors considerats d'activitat turística dins la Llei de Turisme arribin a un consens i regulin les activitats amb un criteri unificat que beneficiï els diferents sectors implicats, en favor de la sostenibilitat i competitivitat del territori, i en pro de la creació de polítiques públiques intel·ligents i de qualitat.

Movilidad turística inteligente, el reto de los DTI

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RESUMEN

Uno de los grandes retos de los destinos turísticos inmersos en la crisis overtourism es la sobredimensión del tráfico urbano e interurbano en determinados periodos del año, fruto de la estacionalidad inherente a un modelo con una intensa ocupación de territorio y alta densidad turística. A lo largo de esta ponencia, se propone que una solución a dicho reto es la gestión inteligente de la movilidad, que denominamos movilidad turística inteligente (MTI). El recurso al big data ayuda a optimizar la eficiencia en la gestión de movilidad. Permite apostar por la comodidad, la personalización y la fluidez, al mismo tiempo que evitar las conglomeraciones peatonales y vehiculares en destino, gracias a la introducción de nuevas pautas de movilidad turística. Lo que revierte en el nivel de competitividad del destino. De esta manera, se avanza en la construcción de un territorio turístico sostenible, accesible y facilitador de la interacción e integración del visitante con el entorno, incrementado la calidad de su experiencia en destino y mejorando la calidad de vida del residente. Por tanto, la MTI facilita la transformación del destino en un Destino Turístico Inteligente (DTI), a través de la gobernanza inteligente de la movilidad.

What smart tourism in post conflict cities resilience following an urbicide process? The role of new technologies in urban tourism in the Western Balkans

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ABSTRACT

The 1990s marked the end of Yugoslavia and the height of conflict and urban destruction (Dubrovnik, Mostar, Sarajevo and later Belgrade). Bogdanovic (1993), an architect and former mayor of Belgrade, coined the neologism 'urbicide' to designate an enterprise of urban destruction which goes beyond the simple strategic objective of the physical destruction of the city, but that of the annihilation of memories, identities, and cultures associated with the city in question and its urbanity, that is to say, of the 'ritualized murder of the city'.

At the end of these multiple conflicts, the cities and the related tourism had to be rebuilt. Over the last twenty years, information technologies, the creation of peer-to-peer digital platforms (Booking, Airbnb, Expedia) and virtual reality for museum and heritage visits have boosted the attractiveness of the destination and tourism projects. The emergence of tourism projects based on digital and new technologies is booming in the Balkans, particularly the capitals like Belgrade or Sarajevo. By looking at different technological and digital projects for tourism purposes, we will see how local, private, transnational and citizen actors have taken up this project and if this project contributes to the touristic destination.

Customer Engagement in Luxury Hospitality: Barcelona Case Study

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ABSTRACT

Despite being an important topic in hospitality, little is known about the emotional connection between customers and employees, as well as its significance in modern times in the luxury hospitality industry. Thus, the purpose of this study is to analyze the level of customer engagement in luxury hotels in the city of Barcelona.

In order to have a better understanding of customer perception, content analysis, in particular was chosen as a research method that combines quantitative and qualitative approaches. Sentiment analysis was chosen as a technique used to analyze unstructured data related to emotions, as text data (Bacik et al, 2020). Reviewed data was retrieved in English, Spanish, Chinese and Russian languages from online review platforms as TripAdvisor and Ctrip. Finally a Tag Cloud was designed as a predictive tool to establish correlations between tags and emotions.

Based on these findings, the level of satisfaction on customers of 5* and 5* Grand Luxe hotels in Barcelona, was found to be high, due to the ratings on the online platforms TripAdvisor and Ctrip. It was confirmed that in social media, staff plays an important role, when writing about their memories and experiences.

This study confirms customer satisfaction and further rating is highly correlated with employee performance. Moreover, awareness and appreciation of emotional connection and experience have grown through the years in this particular case.

Smart Governance applied by smart islands

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ABSTRACT

It is increasingly recognised that governance of destinations can be considered smart when it is based on the ability of different public and private actors to cooperate and collaborate. However, smart governance risks to be ineffective without well defined and adequate community participation structures and objectives.

This paper explores the model of smart governance applied by island contexts and, specifically, the local community involvement as a key pillar of smart destinations. Smart island is currently being adopted by different island territories as a strategic tool to achieve sustainable development.

The methodology of this study has considered the selection of destinations that are in a different stage of smart island and tourism development, in order to analyse their smart governance models and community participation mechanisms. The results based on the empirical analysis of the cases demonstrate the importance to define the participation mechanisms and objectives of their models of smart destination governance, to increase the commitment of all actors and the level of public involvement in decision making processes.

The study identifies possible actions that destination managers and policy makers can consider to incorporate community participation into smart strategic plans, in the initial stage of a smart island development, to implement a holistic smart island participatory governance.

Patrimonio cultural inmaterial y política turística: el caso del turismo gastronómico

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RESUMEN

Citando a Estévez (1999: 118), el autor mencionaba que "no hay aspecto de la vida social que no tenga ya un tratamiento patrimonial". Algo que, según Prats no debería hacernos perder la perspectiva de la consideración de dicho patrimonio como una construcción sociocultural de carácter histórico y con base particular, cuyo "rasgo esencial es su carácter simbólico, su capacidad para representar, mediante un sistema de símbolos, una determinada identidad" (1996: 294).

Así, el Patrimonio Cultural Inmaterial como elemento identitario también se ha incorporado en la agenda política de varios países y supone un reto no solo para los agentes públicos encargados de su gestión, sino también para los agentes sociales que desempeñan roles distintos en su manifestación y se ven en ocasiones, inhibidos o constreñidos por las políticas culturales vinculadas con el patrimonio cultural inmaterial. Así, en el marco de los destinos inteligentes, el Patrimonio Cultural Inmaterial debe tener cabida como un elemento que incide en una correcta gestión del destino. Por tanto, el objetivo de la presente comunicación es el de abordar la evolución del turismo gastronómico en la agenda turística de la Comunidad Autónoma de Cataluña.

Para lograrlo, se analizan las políticas turísticas implementadas en Cataluña en los últimos veinte años. La metodología empleada se basa en la revisión documental histórica de documentos públicos a través del análisis de contenido, así como, en la observación directa del fenómeno. Los resultados revelan cómo la gastronomía y el turismo gastronómico, se han convertido en un elemento identitario y representativo de la política turística catalana, así como en elemento de promoción y distinción territorial que se fundamenta en la identidad y la tradición de su gente.

El turismo cinematográfico como estrategia de redistribución turística de los destinos Smart

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RESUMEN

Hoy más que nunca, los destinos turísticos tienen el deber de promover un turismo inteligente o smart tourism para dar respuesta a diferentes retos de la gestión turística. Una de las preocupaciones más compartidas por dichos destinos es evitar la sobrecarga turística en ciertas zonas de las ciudades. En este sentido, cabe destacar que el turismo cinematográfico representa una importante alternativa para diversificar la oferta turística de un modo “inteligente”, objetivo clave para los destinos inteligentes o smart destinations.

De hecho, estudios recientes revelan que el turismo cinematográfico puede actuar como un gran aliado en cuanto a la redistribución del turismo, sobre todo, en áreas saturadas. Si bien es cierto que en las películas y series es habitual observar recursos turísticos icónicos, últimamente, algunos directores como Juanjo Giménez, apuestan por localizaciones menos o nada conocidas para realizar sus rodajes. Este hecho, supone una oportunidad para los destinos. Si estos son capaces de generar una experiencia turística alrededor de dichas localizaciones, mostrando los espacios menos visitados de la ciudad, estarán favoreciendo a una mejor distribución del turismo, contribuyendo, de este modo, a la lucha contra la saturación turística.

Este estudio se centra en analizar el caso de la película “Tres” rodada, principalmente, en los barrios del Carmel y La Font d'en Fargues en el distrito de Horta-Guinardó de Barcelona. El objetivo principal de esta investigación es examinar los escenarios que aparecen en la película Tres en la ciudad de Barcelona y valorar si son susceptibles de ser puestos en valor a través de un producto turístico cultural, con el fin de que esta contribuya a la redistribución turística de la ciudad de Barcelona. De este se desprenden tres objetivos específicos, como son, identificar las localizaciones (recursos) de la ciudad de Barcelona que aparecen en la película “Tres”, en concreto en el distrito de Horta-Guinardó, seleccionar aquellas que sean susceptibles de formar parte de la ruta cinematográfica y comprobar in situ si las localizaciones seleccionadas son aptas en cuanto a interés y accesibilidad para ser puestas en valor turístico.

Con este fin, la investigación empírica se ha desarrollado a partir de una metodología cuantitativa y analítico-descriptiva. En cuanto a la recogida de la información, se han aplicado una serie de indicadores, que provienen del marco

teórico, que han permitido seleccionar y analizar de forma objetiva los recursos elegidos para la propuesta de la ruta. De este modo se pretende contribuir con el aumento de la calidad de vida de los residentes y de la calidad de la experiencia turística desde un enfoque de turismo inteligente, a partir de la ampliación de la oferta turística.

Smart Destination: ¿un factor clave en la decisión del viajero?

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RESUMEN

En la actualidad, son muchos los destinos que están trabajando para certificarse como Smart Destinations. Territorios capaces de adaptarse a las nuevas necesidades del viajero de una forma ética, responsable, y sostenible, utilizando la tecnología como instrumento para conseguirlo.

Pero ¿es consciente el viajero de la importancia de instaurar modelos de gestión turística Smart? ¿está familiarizado con este concepto? ¿es realmente relevante para el visitante?

Este estudio busca dar respuesta a estas cuestiones a través del análisis del comportamiento del viajero en las primeras etapas del Customer Journey, con el fin de averiguar si el concepto Smart Destination influencia de algún modo el proceso de toma de decisión del mismo.

Para ello se aplica una metodología de tipo experimental con una muestra compuesta por dos grupos de individuos (experimental y control) seleccionados a través de un muestreo no probabilístico por juicio o criterio del investigador. El experimento se articula a través de la aplicación de una variable dependiente relacionada con el atractivo turístico del destino, que se repetirá en ambos grupos, y cinco independientes relacionadas con el nivel de Smart, el precio, y la distancia entre el punto de origen y destino, que variarán de orden en el grupo de control. Estas variables permitirán observar y medir la reacción y comportamiento de los individuos, ante los diferentes aportes de información, y con ello determinar el grado de influencia en su proceso de toma de decisión.

Los principales resultados apuntan hacia una influencia baja de las variables relacionadas con el concepto Smart Destination, y una influencia alta de la variable dependiente, evidenciando que, aunque el sujeto tiende a sentirse vinculado o atraído por el universo Smart y todas sus variables, el atractivo turístico sigue siendo la motivación principal a la hora de elegir un viaje.

Attitudes towards machine translation and languages among travelers

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ABSTRACT

In the past few years, advancements in artificial intelligence (AI) have led to a rampant evolution in the field of human translation. Despite the current limitations of machine translation (MT), there has been a growing number of users resorting to it. MT implies both great advantages and risks.

Despite the impact of this technology on society, businesses and individuals, the implications of these developments for how individuals communicate across languages have been scarcely analyzed by previous literature. Although AI and robotization are an increasingly prominent topic in tourism research, MT has thus far been neglected.

The aim of this study was to analyze how attitudes toward machine translation are related to tourists' profiles, travel behaviors, and language mindsets. Two subsamples were examined: i) individuals who had never traveled to learn a language (N=1,521), and ii) language tourists (LTs), who had already traveled to learn or practice a language (N=1,014). In the first part of the study, we compared how individuals with opposing viewpoints on the importance of MT in travel differed in terms of profiles and attitudes toward languages, including both LTs and non-LTs. In the second part, we focused exclusively on LTs. We analyzed how LTs' travel experiences differed according to their agreement with the importance of MT. Statistical quantitative data analysis was performed using IBM SPSS Statistics v.28 and included exploratory data analysis (descriptive statistics and categorical factor analysis) and inferential analysis.

We found out that individuals who are more favorable to MT in the travel context are more likely to be young, single, less educated, speak fewer languages and believe in the primacy of English over other languages in tourism. Concerning LTs specifically, those who did not agree that MT played an important role in their travel experience were more likely to speak the target language more fluently at the time of their trip and to have learned the language in more formal contexts, both before and during the trip. They also reported a higher level of contact with locals, including host families.

Their activities in the destination were more culture-related. In contrast, those respondents who acknowledged the importance of MT in their travel experience reported lower levels of fluency in their target language and less interaction with locals, but greater contact with their relatives, spouse, or partner. They took part in fewer cultural activities in the destination, but engaged in more nature-based activities, sports, and trips to neighboring countries. They were more likely to be volunteers and less likely to be exchange students. Finally, they tended to choose a destination due to its proximity and affordability, as compared to those who did not agree with the importance of MT.

We can therefore conclude that the higher the level of fluency, the lower the likelihood of resorting to MT tools. Individuals who learn languages in more traditional and formal ways are also less likely to consider MT important for their travel experience. This may be due to the fact that in formal learning contexts some teachers discourage the use of translation apps among language learners. Conversely, individuals who only acquire languages informally may be more prone to integrating translation apps in their language learning to support effective interaction with native speakers. In addition, those who report less contact with locals agree more with the usefulness of MT. One possible explanation is that MT is helpful for establishing contact with locals, but it does not presently replace more advanced language skills in the development of deeper connections. Further analysis is needed to investigate the reasons behind this finding.

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CONCLUSIONS

IV STCB. An edition marked by the mobility and the metaverse advances

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CETT Smart Tourism Congress Barcelona closes its fourth edition in a recovery context, in which the sector has been reborn with strength and new challenges.

Our industry has been forced to change in several ways in the last few years. The transformation of business models, products, services, and processes has become usual.

Being resilient, adaptative, accessible, and inclusive is, without a doubt, a key point in our sector. And the CETT Smart Tourism Congress Barcelona is a meeting point for this transformation. A place to transfer knowledge and push towards a smart tourism environment.

First, let us thank the speakers, communicators, and attendees of this fourth edition of the CETT Smart Tourism Congress Barcelona. And also highlight the words of Dr Sigala, Professor and researcher at the University of Piraeus, and Dr Montero, Researcher and associate professor at Universitat Politècnica de Catalunya.

Smart tourism development can be a vehicle to improve our planet's tourism model. Smart Tourism should be the lever that helps us to promote a sector with a future projection based on the promotion of sustainable development, efficiency, and competitiveness of our destinations, and all the actors that coexist in these territories.

That is why we would like to close this congress with a decalogue of good practices in terms of Smart Tourism.

A Decalogue that will help us draw the perfect scenario for the development and transformation of our sector:

FIRST

Based on the pillars of governance, sustainability, technology, and innovation, Smart Tourism is committed to and guarantees the achievement of sustainable development goals, both at the territorial and business levels. A close and symbiotic relationship between actors will facilitate choosing the appropriate path to complete the SDG's checklist by 2030.

SECOND

Smart Tourism is synonymous with Sustainable Development. Tourism must foster sustainability in all fields, dimensions, sectors, and subsectors. So, focusing on sustainable development is a must for us and should also be a must for governments, companies, and people all around the planet.

THIRD

Thanks to the focus on sustainable development, Smart Tourism fights against climate emergency with all the tools at hand. However, by paraphrasing Dr. Arias "there are still some important gaps in the design and implementation of specific regulations".

FOURTH

Competitiveness. Being competitive is more than being on the top. Being competitive means adding value, achieving goals, and becoming better. In this fourth CETT Smart Tourism Congress Barcelona, we have understood being competitive is also being accessible, efficient, and inclusive in terms of mobility, for example, thanks to Xavier Marcé, we understood that mobility can be a tool to connect two realities: the traveler's and the local's.

FIFTH

This competitiveness is also reflected in the visitor's experience. One of Smart Tourism's main goals is to enhance the visitors' experience. Because traveling is more than moving from point A to point B, it is more than sleeping in a hotel, dining in a restaurant, or visiting a museum. Traveling is about fulfilling dreams, about having magical experiences.

SIXTH

Smart Tourism sets the stage for the actor's cooperation. The synergies between the private and public sectors are essential for achieving the industry's future challenges in this smart context.

SEVENTH

Think about maintaining the environment for future generations. In the tourism context, it is not just about what surrounds us but also people. Therefore, keeping the quality of life of the local population is necessary to avoid significant negative impacts such as local degradation or tourism phobia.

EIGHTH

Technology can help us to improve the visitors' experience, as well as to preserve the quality of locals' life and care for the environment, due to the fact that Smart Tourism uses technology not as a goal but as a tool to improve destinations, companies, processes, services, and products in tourism. Dr. Sigala has shown us that technology can also contribute to the creation of a new reality, a new tourism scenario through the development of metaverses. Mr. Pablo Soto talked to us about how the metaverse can become another tool for tourism. And we even saw on the entrepreneurship day how this new scenario already represents a reality for some market segments.

NINTH

The ninth is related to awareness and education. From CETT, we gather all our efforts to train professionals in the sector with the optimal principles and values to understand the industry from the Smart prism from a sustainable, inclusive, accessible, efficient, and competitive point of view. Education should not remain only as the tool to achieve a job at the beginning of our career, but as a friend that accompanies us throughout our lives.

TENTH

Finally, the tenth of this Decalogue is for knowledge transfer. In Smart Tourism, we always talk about progression, advancement, change, transformation, innovation, and development. It is only possible with the involvement of hundreds of thousands of researchers who contribute and transfer their knowledge in this area.

During these two days, we have had the privilege of having great professionals and researchers in Smart Tourism.

And, I am lucky to work surrounded by researchers who here at CETT contribute daily with their experience and knowledge to improve this great tourism industry.

So, to close this Decalogue of Smart Tourism, I invite you to continue researching and contributing to the development of this wonderful scientific field.

Many thanks to all the attendees for your participation. We hope to see you again in the next edition of the CETT Smart Tourism Congress Barcelona in 2024.

